

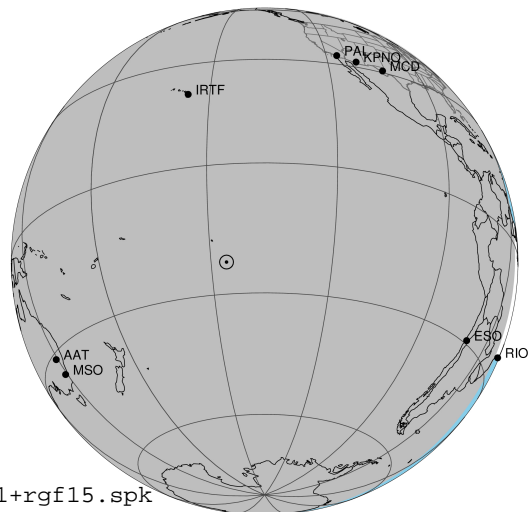
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-07T09:43:25.070
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116744432599154944
 2Mass ID (if available) : 17365277-2250404

Jupiter 2031-06-07T09:43:25 K8.59 G13.44 Pgt

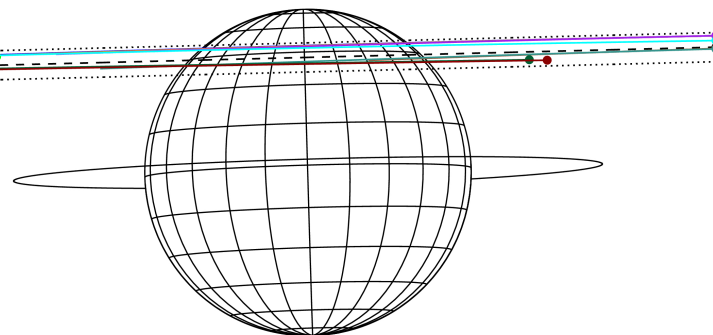
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s

RUWE (>1.4 is poor) : 0.84
 K magnitude : 8.593
 G magnitude : 13.441
 RP magnitude : 12.206
 BP magnitude : 15.140
 DUPflag : 0
 Distance (au) : 4.278
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.11
 Sun-Target sep (deg) : 171.36
 Sun-Moon sep (deg) : 18.56
 B (ring opening deg) : -2.61
 PA of pole (deg) : 1.65
 Pole direction: RA (deg): 268.05693
 Dec (deg): 64.49651
 C/A sky separation (") : 16.247
 C/A sky separation (km) : 50406.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-07T09:43:25 K8.59 G13.44
 Pgt



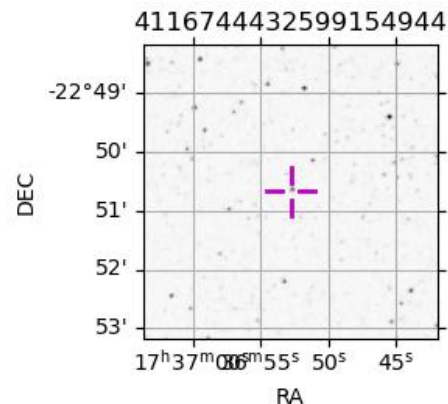
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



2031-06-07T09:43:25.0700 a: 17 36 52.7653 s -22 50 40.608 C/A ***** PA 181.44 deg v_sky -16.11 km/s D 04.28 AU
 Credit: Styled after SORA/Lucky Star

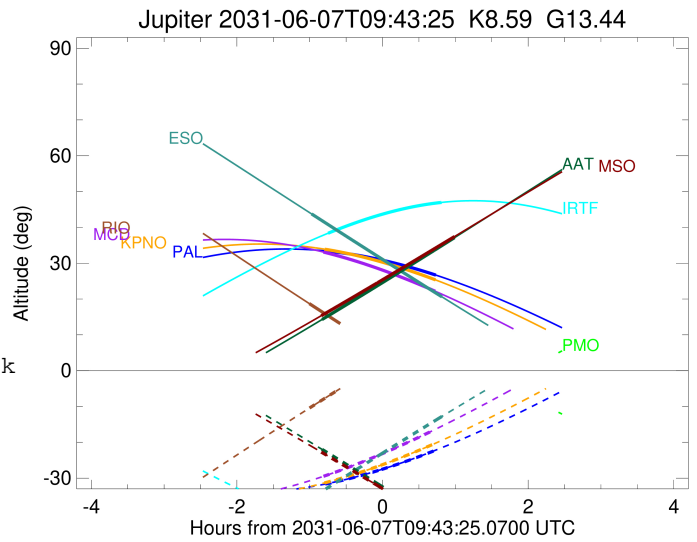
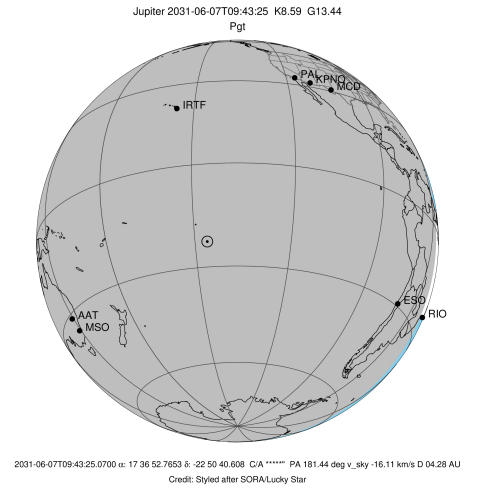
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+ +	JUN 07 08:56 - JUN 07 10:27	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 07 08:55 - JUN 07 10:27	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+ +	JUN 07 08:54 - JUN 07 10:26	Pie
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 07 08:58 - JUN 07 10:31	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
RIO	Rio de Janeiro	-22.9	316.8	+	JUN 07 08:43 - JUN 07 08:43	Pin
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+ +	JUN 07 08:45 - JUN 07 10:32	Pie
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 07 08:53 - JUN 07 10:42	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 07 08:53 - JUN 07 10:42	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T09:41:50.420
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PAL
Location            : Palomar Mt (200")
Latitude (deg)      : 33.35622
E. Longitude (deg)  : 243.13601
Altitude (km)       : 1.706
Gaia source ID      : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.593
G magnitude          : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)  : 18.36
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 17.925
C/A sky separation (km): 55611.5
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

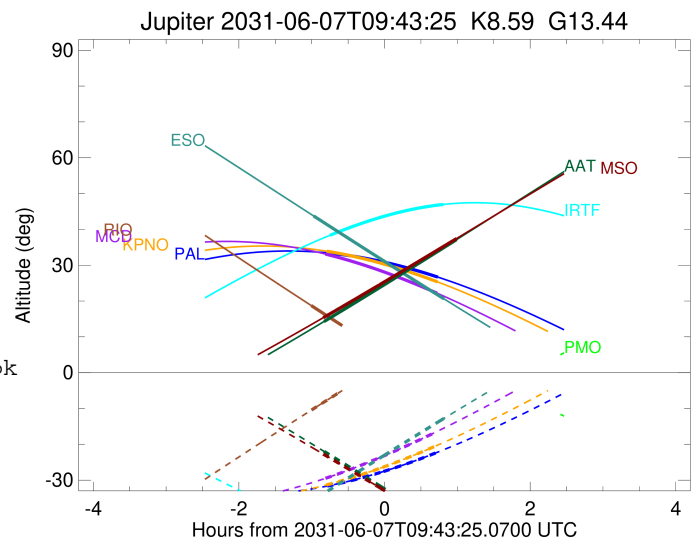
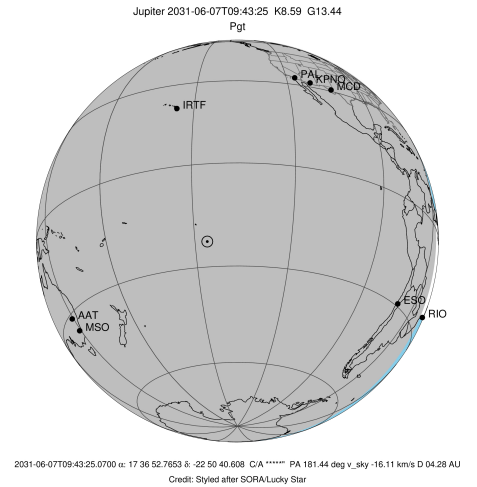


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:56:22.387	33.43	-31.64	71486.4	50.88	54.44
Jupiter	E	2031-06-07T10:27:22.132	26.68	-22.17	71486.4	51.02	54.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-07T09:41:23.320
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 8.593
G magnitude           : 13.441
RP magnitude          : 12.206
BP magnitude          : 15.140
DUPflag              : 0
Distance (au)        : 4.278
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)   : 18.29
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 17.876
C/A sky separation (km): 55462.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

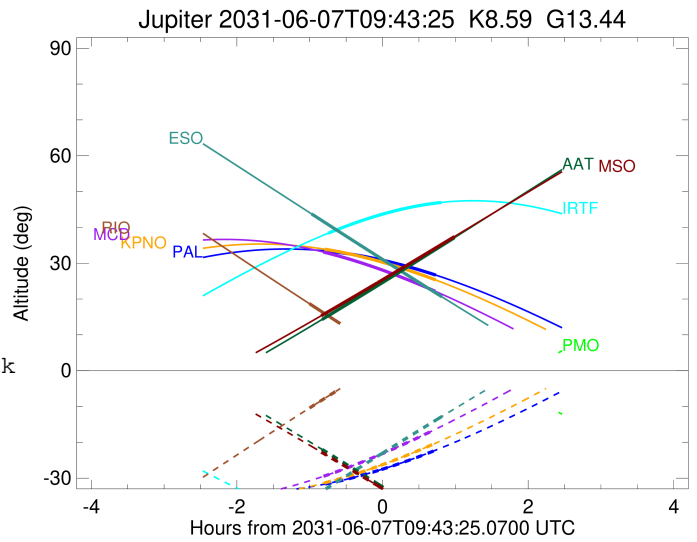
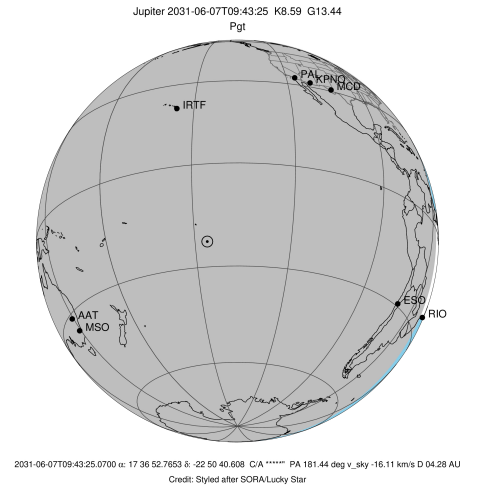


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:55:43.488	33.90	-31.33	71486.4	50.74	54.30
Jupiter	E	2031-06-07T10:27:07.982	25.33	-20.24	71486.4	50.78	54.34

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-07T09:40:46.200
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : MCD
Location             : McDonald Obs. 2.7m
Latitude (deg)       : 30.67158
E. Longitude (deg)   : 255.97844
Altitude (km)        : 2.075
Gaia source ID       : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 8.593
G magnitude           : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag              : 0
Distance (au)        : 4.278
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)   : 18.18
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 17.811
C/A sky separation (km) : 55258.8
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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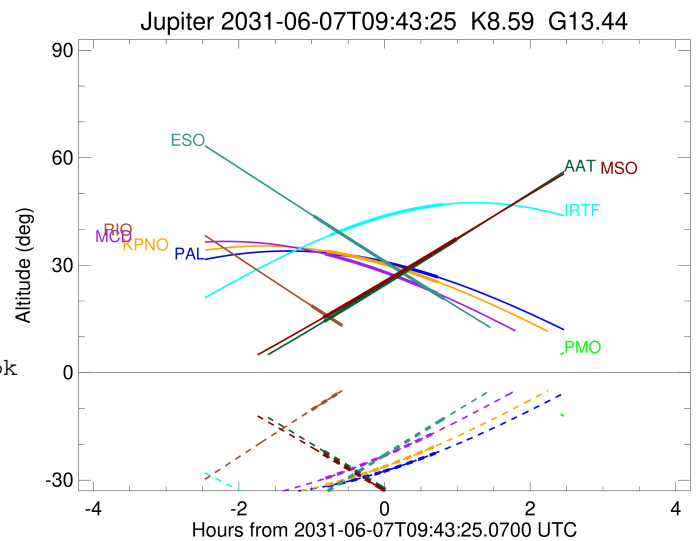
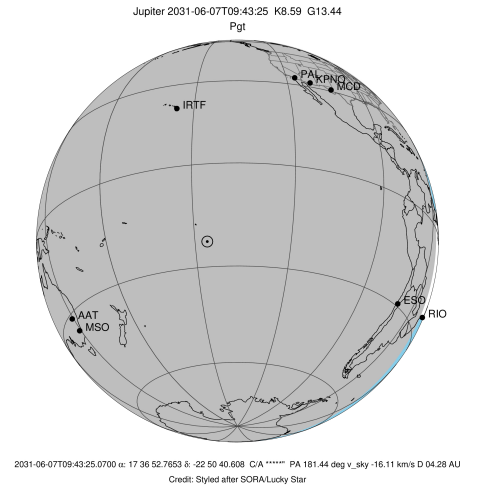


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:54:48.981	33.10	-29.48	71486.5	50.55	54.12
Jupiter	E	2031-06-07T10:26:49.886	22.17	-16.39	71486.5	50.46	54.03

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T09:45:14.730
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg) : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.593
G magnitude          : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag             : 0
Distance (au)        : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)  : 19.00
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 17.587
C/A sky separation (km) : 54562.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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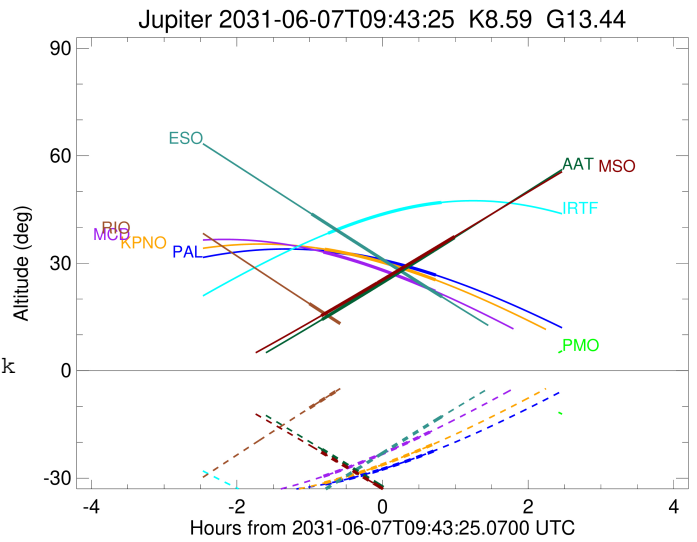
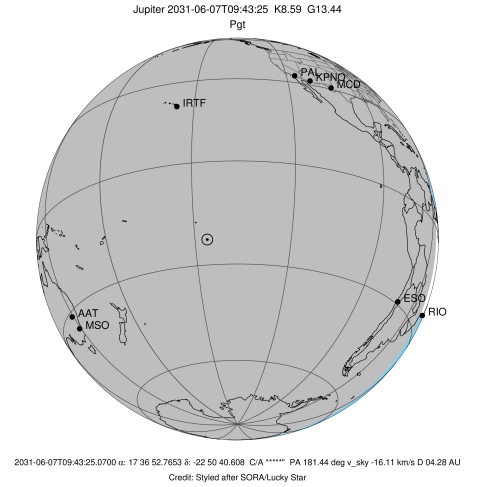


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:58:32.977	38.36	-43.05	71486.7	49.20	52.81
Jupiter	E	2031-06-07T10:31:51.406	46.95	-47.46	71486.5	50.05	53.64

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T09:37:48.240
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.593
G magnitude          : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag             : 0
Distance (au)        : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)  : 17.77
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 15.529
C/A sky separation (km): 48180.1
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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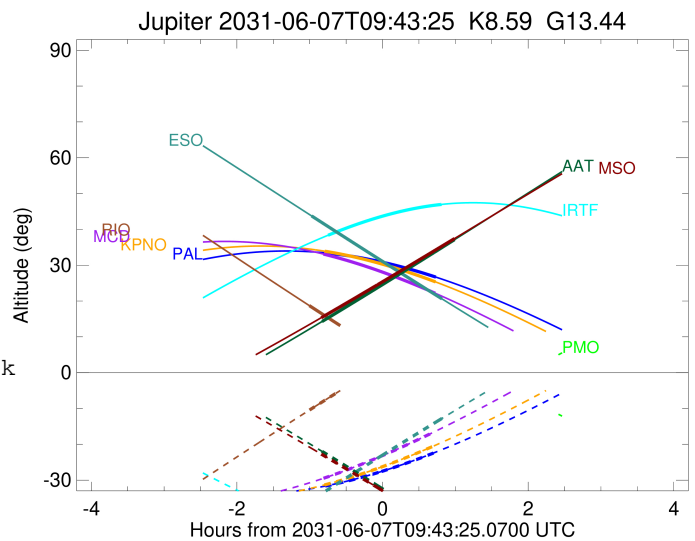
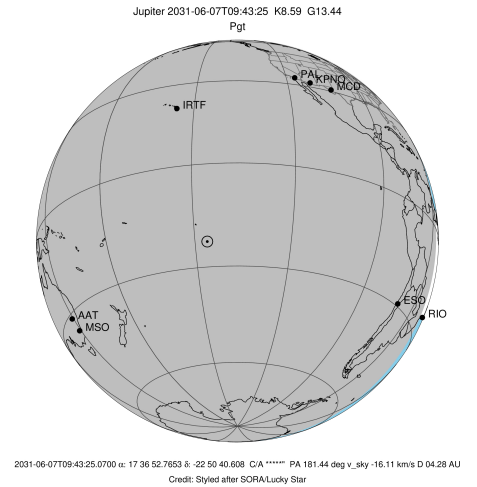


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:43:16.633	18.68	-10.43	71487.7	42.69	46.41
Jupiter	E	2031-06-07T10:32:39.504	-4.72x	12.29x	71487.9	41.94	45.66

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-07T09:38:35.290
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : ESO
Location              : European Southern Obs. (3.6m)
Latitude (deg)        : -29.26097
E. Longitude (deg)    : 289.26831
Altitude (km)         : 2.400
Gaia source ID        : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude           : 8.593
G magnitude           : 13.441
RP magnitude          : 12.206
BP magnitude          : 15.140
DUPflag              : 0
Distance (au)         : 4.278
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)   : 18.01
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 15.659
C/A sky separation (km): 48582.3
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

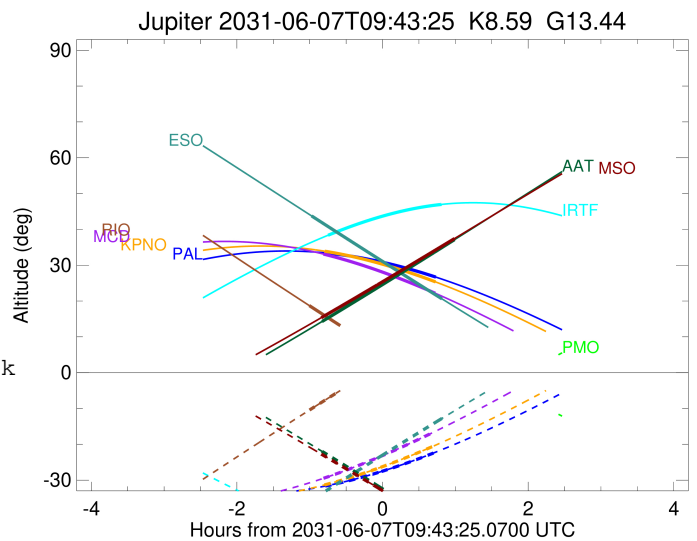
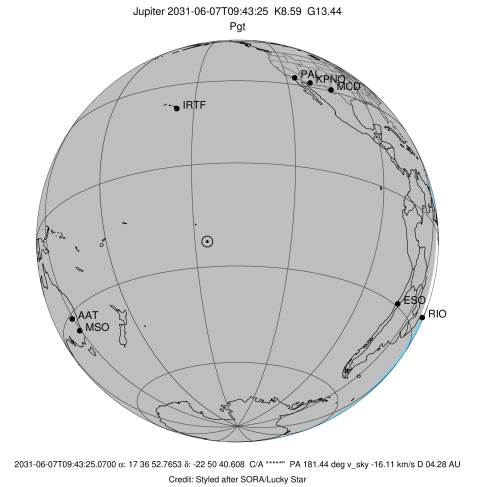


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:45:00.593	43.74	-35.53	71487.7	42.99	46.71
Jupiter	E	2031-06-07T10:32:25.942	20.60	-12.77	71487.8	42.45	46.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T09:48:18.090
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : AAT
Location            : Siding Spring (AAT)
Latitude (deg)      : -31.27703
E. Longitude (deg)  : 149.06608
Altitude (km)       : 1.164
Gaia source ID      : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.593
G magnitude          : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)  : 19.54
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 15.434
C/A sky separation (km) : 47882.9
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

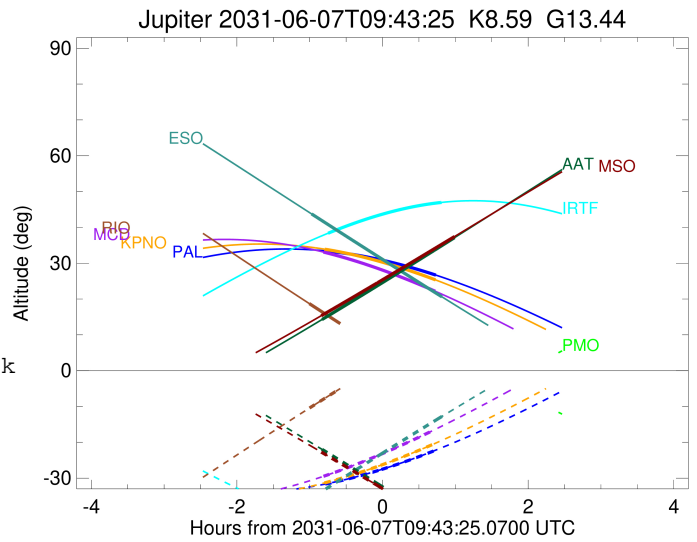
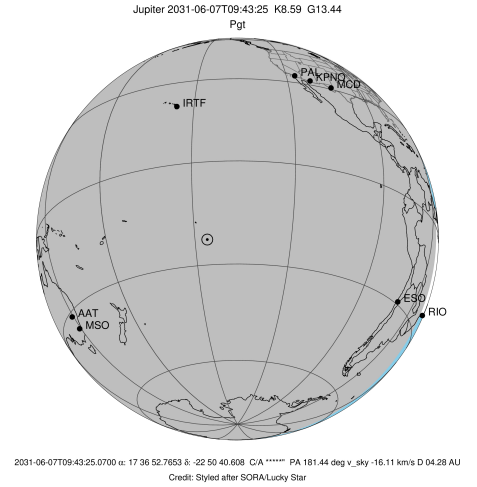


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:53:35.424	14.28	-21.97	71488.0	41.24	44.96
Jupiter	E	2031-06-07T10:42:42.422	37.12	-45.04	71487.7	42.72	46.44


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-07T09:48:04.570
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : MSO
Location            : Mt. Stromlo Observatory
Latitude (deg)      : -35.32000
E. Longitude (deg)  : 149.00833
Altitude (km)       : 0.770
Gaia source ID      : 4116744432599154944
2Mass ID (if available) : 17365277-2250404
ICRS Star Coord at Epoch: 17h 36m 52.76535s -22:50:40.60812s
RUWE (>1.4 is poor) : 0.84
K magnitude          : 8.593
G magnitude          : 13.441
RP magnitude         : 12.206
BP magnitude         : 15.140
DUPflag             : 0
Distance (au)       : 4.278
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.11
Sun-Target sep (deg) : 171.36
Sun-Moon sep (deg)  : 19.52
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.65
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 15.314
C/A sky separation (km) : 47510.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-07T08:53:00.483	15.35	-22.73	71488.0	40.87	44.58
Jupiter	E	2031-06-07T10:42:50.871	37.45	-45.02	71487.8	42.30	46.02